SHIPLEY CO LLC agents, organic binders, reducing agents and base (Eng) C2002-165568 R(AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI semiconductor wafers comprises metal salts, copper complexing 2002-585276/63 Composition for depositing electroless plating 2000.10.24 2000-025989(+2000GB-025989) (2002.05.02) C23C 18/28 A85 E19 L03 SHIL 2000.10.24 *EP 1201787-A2 catalyst on

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NOVELTY

agent(s) and base. salt(s), copper complexing agent(s), organic binder(s), reducing substrate having < 1, preferably 0.5 μm, apertures, comprises metal A composition for depositing an electroless plating catalyst on a

DETAILED DESCRIPTION

(a) a method for depositing an electroless plating catalyst on a (b) a method for manufacturing an integrated circuit by contacting a substrate by contacting the substrate with a composition; and INDEPENDENT CLAIMS are also included for the following:

substrate with a composition, activating the catalyst and contacting

A(12-E7) E(5-S, 10-A22G, 10-B1C1, 10-C2, 10-C2F, 10-C4, 31-K7, 32-A4, 33-A3, 33-G, 35-A, 35-X) L(4-C10)

the catalyst with an electroless plating solution;

(c) a method for depositing a metal seed layer on a substrate or for enhancing a discontinuous metal seed layer that has previously with an electroless plating solution; and composition, activating the catalyst, and contacting the catalyst or the substrate comprising a discontinuous metal seed layer with a been deposited on a substrate comprising contacting the substrate

(d) an electronic device comprising an electroless plating catalyst deposited from the inventive composition

USE

semiconductor wafers having small geometries For depositing electroless plating catalysts on substrates, e.g.,

ADVANTAGE

particularly a copper seed layer. It allows deposition of thin copper neutral to alkaline and thus are less harmful to thin copper seed layers seed layers without the use of tin. The electroless plating catalysts are The invention enhances or repairs discontinuities in a seed layer, EP 1201787-A+

than conventional acidic electroless catalysts

SPECIFIC MATERIALS

The base is lithium hydroxide, sodium hydroxide, potassium hydroxide, or ammonium hydroxide.

EXAMPLE

A catalyst composition comprising 3 g/l copper chloride (metal salt), 2 g/l tartaric acid (organic acid), 11 g/l hydropropylcellulose (organic binder), 4 g/l 13 M potassium hydroxide (base), and 25 g/l hydrophosphorus acid (reducing agent), was applied on a barrier layer-coated wafer having <0.5 µm apertures. The wafer was applied with a discontinuous copper seed layer via plasma vapor deposition. The catalyst was activated by placing the wafer in an oven at 140 °C for 15 minutes. The wafer was then contacted with an electroless copper bath to provide a continuous copper seed layer. The wafer was then electroplated with an acid copper bath to provide apertures filled with copper.

TECHNOLOGY FOCUS

Inorganic Chemistry - Preferred Materials: The metal salts can be copper or palladium salts.

succinic acid, glutaric acid, adipic acid, glucolic acid, lactic acid, substituted 1-12C alkyltricarboxylic acids, 2-12C alkenylcarboxylic can be organic acids, preferably 1-12C alkylcarboxylic acids, 2-12C oxide and propylene oxide, polyurethane polymers having alternating arylcarboxylic acids. The agents can also be organic acids, such as acids, amine carboxylic acids, arylcarboxylic acids or substituted alkenyldicarboxylic acids, substituted 2-12C alkenyltricarboxylic acids, substituted 2-12C alkenylcarboxylic acids, substituted 2-12C acids, 2-12C alkenyldicarboxylic acids, 2-12C alkenyltricarboxylic alkyldicarboxylic acids, 1-12C alkyltricarboxylic acids, substituted 1-Organic Chemistry - Preferred Components: The complexing agents derivatized cellulose polymers, polymers and copolymers of ethylene hydroxypropylcellulose, polysaccharide polymers, cellulose polymers hydroxymethylcellulose, hydroxymethylcellulose and hydroxycellulose, hydroxyalkylcellulose such as Polymers - Preferred Materials: The organic binders can be cellulose The base can also be tetra(1-4)alkylammonium hydroxide. (EDTA), phthalic acid, benzene tricarboxylic acid or salicylic acid. tartaric acid, citric acid or malic acid, ethylenediaminetetraacetic acid formic acid, acetic acid, propionic acid, oxalic acid, malonic acid 12C alkylcarboxylic acids, substituted 2-12C alkyldicarboxylic acids

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	hydrophobic and hydrophilic moieties, poly(maleic anhydride/methyl vinyl ether), polymethacrylic acid, poly(vinyl alcohol), or naphthalene formaldehyde condensates. Chemical Engineering - Preferred Method: The activating step comprises heating, exposure to carbon dioxide or excimer lasers or exposure to ultraviolet radiation. (9pp9529DwgNo.0/0)
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